PRECISION TORQUE TOOLS

★ ADJUSTABLE
★ PRE-SET
★ RATCHET

CERTIFIED JO LINE ACCURACY

★ TWIN-TORQUE
★ SCREWDRIVER
★ SPECIAL

THERE'S A JO-LINE TOOL FOR *every* TORQUE REQUIREMENT!

Recd. 11/7/67

General Torque Facts

CAUSES OF BOLTED JOINT FAILURE/BOLT BREAKAGE

- When maximum load exceeds yield point of bolt material: (1) diameter of bolt is too small for load, or (2) bolt is tightened excessively.
- Fatigue caused by continual change in load. Constant elastic deformation changes structure of bolt material. Reasons: (1) bolt designed improperly, or (2) bolt tightened insufficiently.

LOOSENING

- When external load exceeds load induced by tightening, elastic deformation occurs each time external load changes. External load changes usually caused by (1) dynamic conditions found in reciprocating machinery, and (2) temperature changes.
- Results of elastic deformation: (1) stretching *decreases* bolt diameter a small amount, (2) nut diameter *increases* a small amount through compression, (3) bolt and nut move *apart*, and (4) this action reverses as load is released. This repeated separation and joining of nut and bolt works on the inclined plane of the screw thread causing the nut to move itself "down hill," unscrewing slightly at each load change.

WHY TORQUE TOOLS ARE USED

- Pre-loading of bolt beyond maximum expected external load prevents fatigue failure and loosening.
- *Eliminates broken bolts and stripped threads* by preventing tightening beyond yield point.
- *Permits precise assembly* when critical loads occur in places other than bolts, such as (1) gasket seats, (2) positive electrical contacts, (3) hydraulic or pneumatic assemblies, and (4) accurate pre-loading for cables, textile threads and spindle bearings.
- *Provides established tightening tolerances* for assembly and inspection standards to minimize equipment failure, to reduce repairs and replacements.

TORQUE INFORMATION AND TABLES

On the back page of this folder are formulae to determine torque values of machine screws, torque value conversions, extension compensations, amount of torque required, and tables to indicate the recommended Jo-Line torque tool.

Guarantee

Tools built and sold by JO-LINE TOOLS, INC. are guaranteed to do the job for which they were designed. They have been carefully tested and inspected before leaving the factory. However, if any tool is found with defects in material or workmanship it will be repaired or replaced. This guarantee will not be effective if the tool has been used beyond its capacity, altered or mistreated.

GUARANTEED QUALITY *plus* CERTIFIED ACCURACY

Certification

This torque tool is certified to have been calibrated on _____ (Date) to the accuracy shown below:

ADJUSTABLE	NON-ADJUSTABLE
Model _____	Model _____
Serial Number _____	Serial Number _____
Tolerance at any setting throughout the range: Plus or minus _____ %	Set at _____ Inch Ounces / Inch Pounds / Foot Pounds
Plus _____ Inch Ounces / Inch Pounds / Foot Pounds	Tolerance _____ Inch Ounces / Inch Pounds / Foot Pounds

All applicable sections of Specification MIL-H-4034 A (USAF) have been complied with.

JO-LINE TOOLS, INC.
8442 OTIS STREET
SOUTH GATE, CALIF.

_____ (AUTHORIZED SIGNATURE)

JO-LINE JO-LINE JO-LINE

CERTIFIED JO LINE ACCURACY

JOTITE ADJUSTABLE

PRECISION TORQUE LIMITING WRENCHES

DRIVE SIZES ¼" TO ½" RANGES 5 IN. LBS. TO 150 FT. LBS.

RUGGED ALL-STEEL CONSTRUCTION AND FEW WORKING PARTS PROVIDE LONG SERVICE LIFE — GREATER RESISTANCE TO DAMAGE

CONTROLS TORQUE IN *BOTH* RIGHT AND LEFT-HAND ROTATION

EXCLUSIVE FEATURES OF JO-LINE TORQUE LIMITING TOOLS

- ★ Only torque wrench with individually certified accuracy—factory calibrated within 2% to assure certified accuracy in the field.
- ★ Precision built with internal mechanism sealed.
- ★ Unvarying accuracy — unaffected by position of operator's hand (see note on RAX Models).
- ★ Prevents human error — torque is limited mechanically *by the wrench,* without visual or audible indicators.
- ★ Largest selection of sizes and shapes available anywhere.
- ★ Long service life — tested for one-million cycle endurance and 50% overload.

HOW TO OPERATE JOTITE WRENCHES

SET AT DESIRED TORQUE...

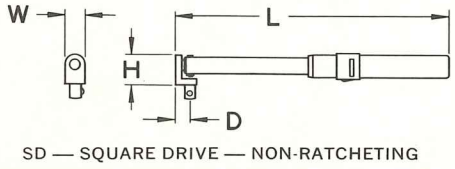
Rotate handhold to desired torque value. Lock in place by pushing lock ring forward.

...AND IT'S READY!

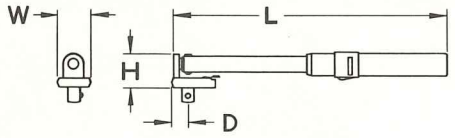
Releases automatically at selected torque. Limited free rotation after release. Positive stop prevents possibility of injury to operator. Resets automatically when force is removed.

NOTE: Other standard model special-purpose drive ends are avail-

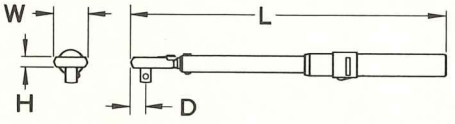
30 DIFFERENT MODELS OF PRECISION TORQUE TOOLS



SD — SQUARE DRIVE — NON-RATCHETING



RA — RATCHETING — SQUARE DRIVE



RAX — EXTENDED RATCHETING — SQUARE DRIVE

JOTITE MODEL	DRIVE SIZE	RANGE	UNITS	L	W	H	D	WEIGHT NET POUNDS
150-SD4	¼	5-150	IN. LBS.	8 1/16	5/8	7/8	7/16	.63
150-SD6	3/8	5-150	IN. LBS.	8 1/16	5/8	7/8	7/16	.63
180-SD4	¼	½-15	FT. LBS.	8 1/16	5/8	7/8	7/16	.63
180-SD6	3/8	½-15	FT. LBS.	8 1/16	5/8	7/8	7/16	.63
750-SD6	3/8	100-750	IN. LBS.	12 1/2	7/8	1 3/16	7/16	1.63
750-SD8	½	100-750	IN. LBS.	12 1/2	7/8	1 3/16	7/16	1.63
900-SD6	3/8	10-75	FT. LBS.	12 1/2	7/8	1 3/16	7/16	1.63
900-SD8	½	10-75	FT. LBS.	12 1/2	7/8	1 3/16	7/16	1.63
1600-SD8	½	700-1600	IN. LBS.	18 3/8	1	1 1/2	3/8	2.00
1800-SD8	½	10-150	FT. LBS.	18 3/8	1	1 1/2	3/8	2.33
150-RA4	¼	5-150	IN. LBS.	8 1/8	1 1/16	1 1/16	½	.72
150-RA6	3/8	5-150	IN. LBS.	8 1/8	1 1/16	1 1/16	½	.72
180-RA4	¼	½-15	FT. LBS.	8 1/8	1 1/16	1 1/16	½	.72
180-RA6	3/8	½-15	FT. LBS.	8 1/8	1 1/16	1 1/16	½	.72
750-RA6	3/8	100-750	IN. LBS.	12 3/4	1 7/16	1 1/2	3/4	1.88
750-RA8	½	100-750	IN. LBS.	12 3/4	1 7/16	1 1/2	3/4	1.88
900-RA6	3/8	10-75	FT. LBS.	12 3/4	1 7/16	1 1/2	3/4	1.88
900-RA8	½	10-75	FT. LBS.	12 3/4	1 7/16	1 1/2	3/4	1.88
1600-RA8								
1800-RA8								
150-RAX4	¼	5-150	IN. LBS.	9 3/8	1 1/16	3/8	½	.72
150-RAX6	3/8	5-150	IN. LBS.	9 3/8	1 1/16	3/8	½	.72
180-RAX4	¼	½-15	FT. LBS.	9 3/8	1 1/16	3/8	½	.72
180-RAX6	3/8	½-15	FT. LBS.	9 3/8	1 1/16	3/8	½	.72
750-RAX6	3/8	100-750	IN. LBS.	14 5/8	1 7/16	½	3/4	1.88
750-RAX8	½	100-750	IN. LBS.	14 5/8	1 7/16	½	3/4	1.88
900-RAX6	3/8	10-75	FT. LBS.	14 5/8	1 7/16	½	3/4	1.88
900-RAX8	½	10-75	FT. LBS.	14 5/8	1 7/16	½	3/4	1.88
1600-RAX8	½	700-1600	IN. LBS.	19	1 7/16	1 3/16	3/4	2.53
1800-RAX8	½	10-150	FT. LBS.	19	1 7/16	1 3/16	3/4	2.53

DISCONTINUED

MIL-H-4034, TYPES I AND III
GGG-W-686, TYPE III, CLASS I

GGG-W-686, TYPE III, CLASS II

CERTIFIED ACCURACY ± 3% + 2 INCH POUNDS (.2 FOOT POUNDS)

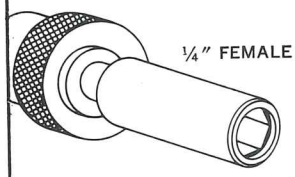
NOTE: IMPORTANT! Jotite and Jotru torque tools, models SD and RA, are completely accurate regardless of location of operator's hand on handle — operator **cannot influence** accuracy.

JO-LINE TOOLS, inc. • 8442 OTIS STREET, SOUTH GATE, CALIFORNIA

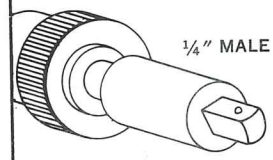
JO-LINE TOOLS, INC.

8442 OTIS STREET, SOUTH GATE, CALIFORNIA • 567-1366, Area 213 • Teletype 213-773-5868 • Cable JONMAC

CERTIFIED JO LINE ACCURACY



¼" FEMALE HEX



¼" MALE SQUARE

JOMAX

INSTRUMENT TYPE MICRO-TORQUE TOOLS

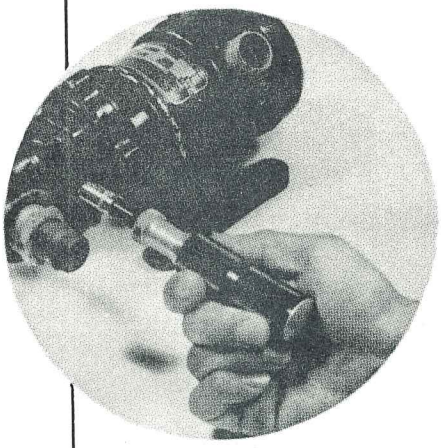
For absolute torque control in instrument, servo-system, or similar electro-mechanical applications, JO-LINE offers the versatile new JOMAX torque screwdriver. Available in two lightweight models, the JOMAX 10 with a torque range of 4 to 100 inch ounces and the JOMAX 50 with a range of 2 to 30 inch pounds, these units provide consistent control of torque forces at either laboratory or assembly-line stages without excessive costs of elaborate test procedures.

Both models feature precision micrometer adjustment, automatic release at pre-set torque with instantaneous re-set, and control of torque in both right and left hand directions. A full line of bits and attachments is available to accommodate a wide range of applications. Accuracy of both JOMAX models is covered by the JO-LINE Certificate of Calibration and traceable to the National Bureau of Standards. Tolerances are ±3% + 2 inch ounces for the JOMAX 10 and ±3% + 2 inch pounds for the JOMAX 50. More precise accuracies throughout the range are available on request.

SPECIFICATIONS

	JOMAX 10	JOMAX 50
TORQUE RANGE	4 - 100 inch ounces	2 - 30 inch pounds
CALIBRATION INCREMENTS	½ inch ounce	¼ inch pounds
CERTIFIED ACCURACY	3% + 2 inch ounce	3% + 2 inch pounds
DRIVE HEAD	¼" FEMALE HEX (accepts all std. hex bits)	¼" FEMALE HEX (accepts all std. hex bits)
OPTIONAL DRIVE*	¼" MALE SQUARE	¼" MALE SQUARE
LENGTH	5½" OAL	5½" OAL
DIAMETER	1" DIA.	1" DIA.
WEIGHT	5¾ ounces	5¾ ounces

*Units will be supplied with ¼" hex drive unless otherwise specified.



FEATURES

- **Certified Accuracy — traceable to National Bureau of Standards.**
- **Small, lightweight, rugged; suitable for laboratory or assembly line.**
- **Precision micrometer adjustments allow fast, positive settings.**
- **Controls torque in both right and left hand directions.**
- **Automatic release at pre-set torque with instantaneous re-set.**
- **Meets Mil-H-26497A specification.**

SPECIAL TOOLS Quotations for Special Jo-Line Torque Tools available on request, without obligation.

JO-LINE TOOLS, INC.

8442 OTIS STREET, DEPT. MC, SOUTH GATE, CALIFORNIA • 567-1366, Area 213 • Teletype 213-773-5868 • Cable JONMAC

JO-LINE

JO-LINE

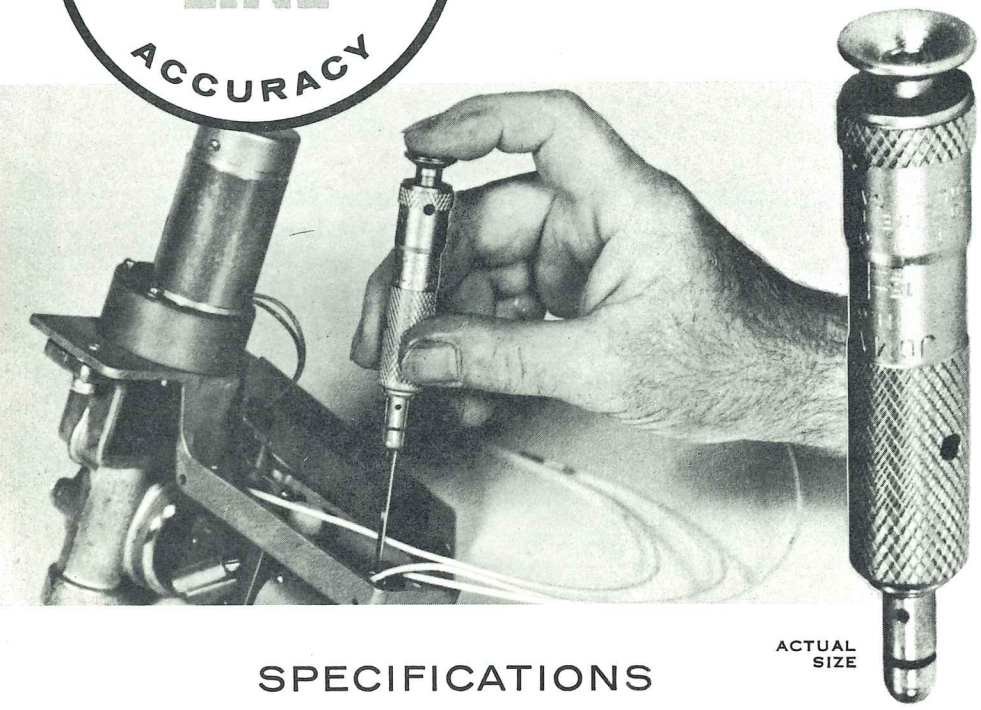
JO-LINE

CERTIFIED JO LINE ACCURACY

ALL STAINLESS STEEL

JOMAX 2

MICRO-TORQUE SCREWDRIVER



ACTUAL SIZE

FOR SCREW SIZES #00 THROUGH #10

SPECIFICATIONS

- ★ Torque screw sizes #00 through #10.
- ★ Torque limiting range 0 to 20 inch ounces.
- ★ Torque limits adjustable in increments of ½ inch ounce.
- ★ Accuracy ±¼ inch ounce.
- ★ Controls torque in both right and left-hand directions of rotation.
- ★ All stainless steel construction.
- ★ Lightweight, compact, only 3½ inches overall. Diameter ⅝ inch.
- ★ Holds standard micro-fastener bits in positive-grip, slip-type clutch which accommodates all types of fastener drivers including slotted, Phillips, Bristol, hex screw or hex nut.

JO-LINE prevents human errors—Torque is limited by the wrench, not by the operator

DISTINCTIVE FEATURES

Positive, precision torque-limiting control over the tightness of extremely small fasteners from #00 through #10 is provided by JOMAX 2. Overtorque is unfailingly prevented by a slipclutch mechanism that releases sensitively and instantaneously when the preselected amount of torque has been applied to a fastener. Reset is automatic. No clicks and no vertical motions of the screwdriver body are involved and impacting is impossible.

JOMAX 2 is designed especially for use with electro-mechanical components; professional, scientific, automotive, electronic and controlling instruments; photographic and optical products; clocks and other small assemblies which are critically sensitive to tightening stresses.

Stainless steel construction makes JOMAX 2 non-magnetic and corrosion-proof. Since stainless steel does not collect ferrous dust, JOMAX 2 is particularly suited for clean room assembly operations.

Knurled grip, with diameter of ⅝ in., plus lightweight construction, minimizes finger fatigue. Free turning spinner at top facilitates skilled and delicate control. Micrometer-type torque adjustment is at top of tool to avoid interference with fingers during operation.

Although JOMAX 2 is a finely built precision tool, dropping it from a height of 5 feet on a concrete surface causes no damage or accuracy impairment.

JOMAX 2 is packaged in high-impact, polystyrene case with polyurethane pad.

THERE'S A JO-LINE WRENCH OR TOOL FOR EVERY TORQUE REQUIREMENT!

SPECIAL TOOLS: Quotations for Special Jo-Line Torque Tools available on request, without obligation.

JO-LINE TOOLS, INC.

8442 OTIS STREET • SOUTH GATE, CALIFORNIA • 567-1366, Area 213 • Teletype 213-773-5868 • Cable JONMAC

CERTIFIED JO LINE ACCURACY

JO-LINE IS THE ONLY COMPANY WITH A COMPLETE LINE TO HANDLE *any* TORQUE LIMITING NEED

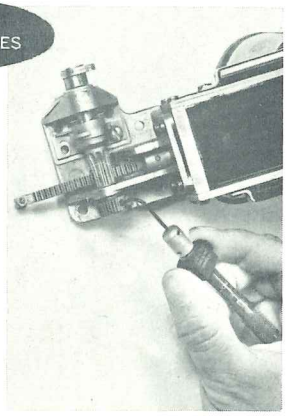
★ ADJUSTABLE ★ RATCHET ★ SCREWDRIVER
★ PRE-SET ★ MINIATURE ★ SPEED ★ SPECIAL

For any application, ranging from one inch ounce to 2000 foot pounds, there is a Jo-Line torque wrench that will do the job with unvarying accuracy. It is a precision torque wrench with *individually certified accuracy*—factory calibrated to tolerances small as ½ %. All models are carefully built, with internal mechanism sealed and ruggedly constructed to assure long service life. Service-tested for multi-million cycle endurance and 50% overload.

JO-LINE PREVENTS HUMAN ERRORS—TORQUE IS LIMITED *BY THE WRENCH, NOT BY THE OPERATOR*

JOMITE 5A MICRO-FASTENER "PUSH-BUTTON" TORQUE WRENCH

5 TO 80 INCH OUNCES



This new, absolutely unique miniaturized tool is built to control the tightness of small fasteners with thread sizes #0 to #10. Designed to reach into, under, over or behind obstructions to assemble screws which *cannot be correctly torqued in other ways*. Proved "center of torque" principle assures precise accuracy.

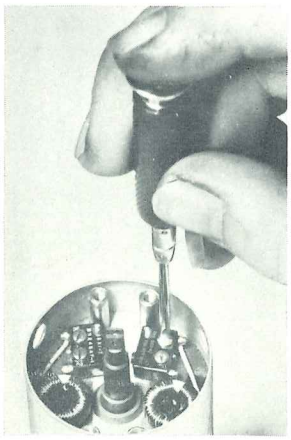
Torque is completely adjustable by turning the micrometer-type handle until the desired value is indicated by the calibration marks. The driving attachment slips over the 3/16 inch square connector where it is held into position by a ball retainer.

OPERATING RANGE of the JOMITE 5A is 5 through 80 inch ounces, adjustable in increments of ½ inch ounce. Overall length 3 inches, thickness ⅜ inch, weight less than ½ ounce. Accuracy is 3% or ½ inch ounce, whichever is greater. Supplied with ¼ inch square drive attachment which can be used with standard sockets for nut-driving or testing operations. Hex, Bristol, Phillips and straight bladed driving bits are available.

TORQUING OPERATION is accomplished by thumb-and-forefinger on the push-button control. This feature positively localizes the input effort. When the indicated amount of torque has been applied by JOMITE 5A, the button releases automatically and moves a short distance through the wrench body. Torque can be controlled in both right and left-hand directions.

JOSPIN MICRO-TORQUE SCREWDRIVER

2 TO 20 INCH OUNCES



Positive control over the tightness of extremely small fasteners from #00 through #4 is provided by JOSPIN. It is designed specifically for assemblies critically sensitive to tightening stresses.

Torque release point is selected by inserting a hex key in the adjusting screw located at the top of the tool. The adjustment is not calibrated. JOSPIN accepts standard micro-fastener bits in a positive grip, slip type chuck. Bits are available from Jo-Line or other sources in slotted, Phillips, hex screw, Bristol or hex nut drivers.

OPERATING RANGE of JOSPIN is 2 to 20 inch ounces. Overall length 3 inches, diameter ½ inch. Length, or height, is minimized to provide close, sure operator control of the tool. The diameter is ample to permit easy application of the torque. Finger spinner on top turns freely so that the screwdriver can be handled with skill and efficiency.

TORQUING OPERATION is controlled by a slip clutch mechanism that releases sensitively and smoothly when the pre-selected amount of torque has been transmitted through it. No clicks and no vertical motions of the screwdriver body are involved and impacting is impossible. Overtorque is positively prevented.

SPECIAL TOOLS Quotations for Special Jo-Line Torque Tools available on request, without obligation.

JO-LINE
JO-LINE
JO-LINE

CERTIFIED JO LINE ACCURACY

JOTRU

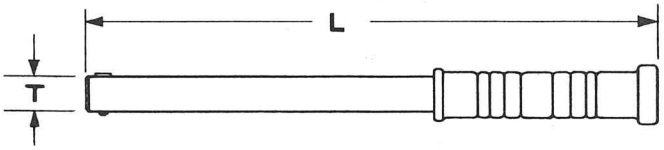
STOCK MODEL SPECIAL PURPOSE TORQUE TOOLS

★ The standard Jo-Line drive ends in this catalog sheet are intended for use with Jotru torque handles. They are, however, also adaptable to Jo-Line adjustable Jotite torque tool handles.

★ Hundreds of unique torque tool needs have been solved successfully by Jo-Line engineers. You are invited to submit your particular requirements to the factory for analysis and recommendations.

SIZES INDICATED IN INCHES

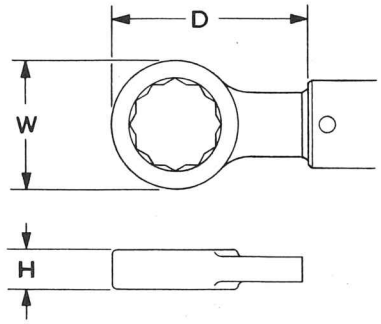
STANDARD JOTRU TORQUE HANDLE WITHOUT DRIVE END



Jotru Model	Handle Dimensions		Ranges		Adjustment	
	L	T	Inch Pounds	Foot Pounds	Tool	Plug
5	5	9/16	5-30	1/2-2 1/2	*	*
5A	5	9/16	15-50	1 1/2-4	*	*
10	5	13/16	25-70	2-6	1826	1827
10A	6	13/16	50-250	4-20	1826	1827
50	10	13/16	75-500	6-40	1826	1827
100	14	1	400-1500	33-125	1831A	1832A
100A	18	1	400-1500	33-125	1831A	1832A

*Models 5 and 5A have screwdriver adjustment protected by tamper-proof sealant. Special adjusting tools are used with other models and settings are protected with non-reusable plugs.

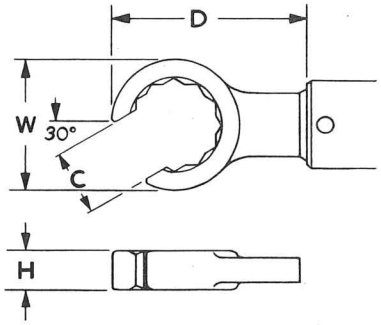
BX SERIES • BOX END



STANDARD JOTRU TORQUE HANDLE & BX DRIVE COMBINATIONS

Hex Size	Standard Jotru Torque Handle	BX Drive No.	BX Drive Dimensions		
			D	W	H
3/8	5, 5A, 10, 10A	BX6	7/8	3/4	15/32
7/16	5, 5A, 10, 10A	BX7	15/16	13/16	17/32
1/2	5, 5A, 10, 10A, 50	BX8	15/16	7/8	17/32
9/16	5, 5A, 10, 10A, 50	BX9	1 1/8	1	17/32
5/8	10, 10A, 50, 100, 100A	BX10	1 1/4	1 1/8	11/16
11/16	10, 10A, 50, 100, 100A	BX11	1 5/16	1 3/16	11/16
3/4	10, 10A, 50, 100, 100A	BX12	1 5/16	1 3/16	23/32
13/16	10, 10A, 50, 100, 100A	BX13	1 1/2	1 3/8	23/32
7/8	10, 10A, 50, 100, 100A	BX14	1 1/2	1 3/8	3/4
15/16	50, 100, 100A	BX15	1 5/8	1 1/2	3/4
1	50, 100, 100A	BX16	1 5/8	1 9/16	25/32
1 1/16	50, 100, 100A	BX17	1 13/16	1 5/8	25/32
1 1/8	50, 100, 100A	BX18	1 7/8	1 3/4	7/8
1 3/16	50, 100, 100A	BX19	1 15/16	1 7/8	7/8
1 1/4	50, 100, 100A	BX20	2	1 7/8	7/8
1 3/8	100, 100A	BX22	2 1/16	2 1/4	15/16
1 1/2	100, 100A	BX24	2 1/16	2 1/4	15/16
1 7/8	100, 100A	BX30	3 3/16	3	1 1/16
2	100, 100A	BX32	3 3/16	3	1 1/16
2 1/4	100, 100A	BX36	3 9/16	3 3/8	1 1/8

CR SERIES • FLARE NUT



STANDARD JOTRU TORQUE HANDLE AND CR DRIVE COMBINATIONS

Hex Size	Standard Jotru Torque Handle	CR Drive No.	CR Drive Dimensions			
			D	W	C	H
3/8	5, 5A, 10, 10A	CR6	7/8	3/4	.281	.469
7/16	5, 5A, 10, 10A	CR7	15/16	13/16	.344	.531
1/2	5, 5A, 10, 10A	CR8	15/16	7/8	.375	.531
9/16	5, 5A, 10, 10A	CR9	1 1/8	1	.438	.531
5/8	10, 10A, 50	CR10	1 1/4	1 1/8	.469	.688
11/16	10, 10A, 50	CR11	1 5/16	1 3/16	.531	.688
3/4	10, 10A, 50	CR12	1 5/16	1 3/16	.562	.719
13/16	10, 10A, 50	CR13	1 1/2	1 3/8	.625	.719
7/8	10, 10A, 50, 100, 100A	CR14	1 1/2	1 3/8	.688	.750
15/16	50, 100, 100A	CR15	1 5/8	1 1/2	.719	.750
1	50, 100, 100A	CR16	1 5/8	1 9/16	.750	.781
1 1/16	50, 100, 100A	CR17	1 13/16	1 5/8	.781	.781
1 1/8	50, 100, 100A	CR18	1 7/8	1 3/4	.844	.875
1 3/16	50, 100, 100A	CR19	1 15/16	1 7/8	.906	.875
1 1/4	50, 100, 100A	CR20	2	1 7/8	.938	.875
1 3/8	100, 100A	CR22	2 1/16	2 1/4	1.026	.938
1 1/2	100, 100A	CR24	2 1/16	2 1/4	1.125	.938
1 7/8	100, 100A	CR30	3 3/16	3	1.375	1.062
2	100, 100A	CR32	3 3/16	3	1.562	1.062
2 1/4	100, 100A	CR36	3 9/16	3 3/8	1.688	1.125

SEE NEXT PAGE FOR ADDITIONAL DRIVE ENDS

JO-LINE TOOLS, INC.
8442 Otis Street
South Gate, California
A Suburb of Los Angeles
Telephone: LOrain 7-1366 • Cable: JONMAC

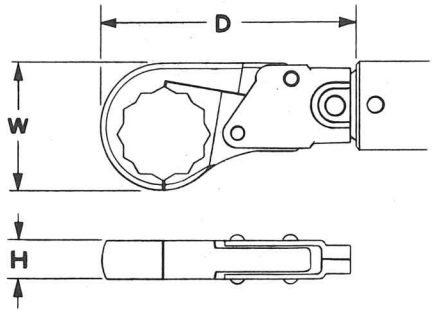
CERTIFIED JO LINE ACCURACY

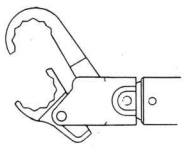
JOTRU

STOCK MODEL SPECIAL PURPOSE TORQUE TOOLS

SIZES INDICATED IN INCHES

KT SERIES • KWIK-TITE RATCHETING





SNAPOVER FEATURE

Speeds assembly of tube fittings, high pressure hose fittings, machine nuts, hex fasteners and virtually every type of fitting. Placing jaws over side of nut and lifting handle slightly causes jaws to snap closed, ready for ratcheting. To remove, push wrench forward and down.

STANDARD JOTRU TORQUE WRENCH & KT DRIVE COMBINATIONS

Hex Size	Standard Jotru Torque Wrench	KT Drive No.	KT Drive Dimensions		
			D	W	H
3/8	5, 5A, 10, 10A	KT6	2 1/4	3/4	9/32
7/16	5, 5A, 10, 10A, 50	KT7	2 1/4	27/32	9/32
1/2	5, 5A, 10, 10A, 50	KT8	2 5/16	29/32	9/32
9/16	5, 5A, 10, 10A, 50	KT9	2 5/16	1 1/32	9/32
5/8	10, 10A, 50	KT10	2 11/16	1 3/16	3/8
11/16	10, 10A, 50	KT11	2 11/16	1 1/4	3/8
3/4	10, 10A, 50	KT12	2 13/16	1 5/16	3/8
13/16	10, 10A, 50	KT13	3 3/8	1 1/2	7/16
7/8	10, 10A, 50	KT14	3 3/8	1 1/2	7/16

HOW TO ORDER A JOTRU SPECIAL PURPOSE TORQUE WRENCH:

1. Jotru model number.
2. Drive end number.
3. Torque setting.
4. Adjusting tool and plug, if required.

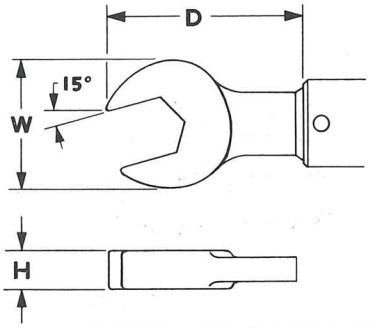
Example: Jotru 10A-BX10 set at 120 inch pounds with No. 1826 Adjusting Tool and No. 1827 Plugs.

SEE PRECEDING PAGE FOR ADDITIONAL DRIVE ENDS

Many Jo-Line special purpose torque tools have been developed in addition to those covered by this catalog sheet, one or more of which may be ideal for your own specific needs.

JO-LINE TOOLS, INC.
8442 Otis Street
South Gate, California
A Suburb of Los Angeles
Telephone: LOrain 7-1366 • Cable: JONMAC

OE SERIES • OPEN END

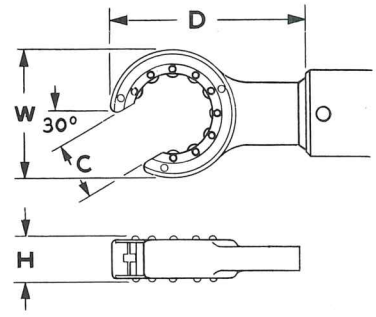


STANDARD JOTRU TORQUE HANDLE & OE DRIVE COMBINATIONS

Hex Size	Standard Jotru Torque Handle	OE Drive No.	OE Drive Dimensions		
			D*	W	H
1/4	5, 5A	OE4		9/16	5/32
5/16	5, 5A	OE5		11/16	3/16
11/32	5, 5A	OE5.5		13/16	3/16
3/8	5, 5A, 10, 10A	OE6		13/16	7/32
7/16	5, 5A, 10, 10A	OE7		15/16	1/4
1/2	5A, 10, 10A, 50	OE8		1 1/16	1/4
9/16	5A, 10, 10A, 50	OE9		1 3/16	9/32
5/8	10, 10A, 50	OE10		1 5/16	9/32
11/16	10, 10A, 50	OE11		1 7/16	5/16
3/4	10, 10A, 50, 100, 100A	OE12		1 9/16	11/32
13/16	50, 100, 100A	OE13		1 11/16	11/32
7/8	50, 100, 100A	OE14		1 13/16	3/8
15/16	100, 100A	OE15		1 15/16	13/32
1	100, 100A	OE16		2 1/8	7/16
1 1/16	100, 100A	OE17		2 1/8	1/2
1 1/8	100, 100A	OE18		2 1/4	1/2
1 1/4	100, 100A	OE20		2 17/32	17/32

OE Series also available in millimeter sizes on special order.
*Dimensions "D" supplied on request.

CL SERIES • CAM-LOC RATCHETING



STANDARD JOTRU TORQUE HANDLE & CL DRIVE COMBINATIONS

Hex Size	Standard Jotru Torque Handle	CL Drive No.	CL Drive Dimensions			
			D	W	C	H
3/8	5, 5A, 10, 10A	CL6	2 1/16	1 3/16	1/4	7/16
7/16	5, 5A, 10, 10A	CL7	2 1/16	1 1/4	1/4	7/16
1/2	5, 5A, 10, 10A	CL8	2 1/16	1 3/8	5/16	7/16
9/16	5, 5A, 10, 10A	CL9	2 1/8	1 1/2	3/8	7/16
5/8	10, 10A, 50	CL10	2 3/16	1 3/4	7/16	9/16
11/16	10, 10A, 50	CL11	2 1/4	1 13/16	7/16	9/16
3/4	10, 10A, 50	CL12	2 5/16	1 7/8	1/2	9/16
7/8	10, 10A, 50	CL14	2 1/2	2 3/16	5/8	9/16
1	10, 10A, 50	CL16	2 9/16	2 3/8	5/8	9/16

Fits over burred or heavily painted nuts—ideal for tube fittings, soft aluminum, brass or plastic nuts and bolts—will not mar chromed fittings. Steel rollers, backed by expansion springs, provide ratcheting action.

PRINTED IN U. S. A. S-542

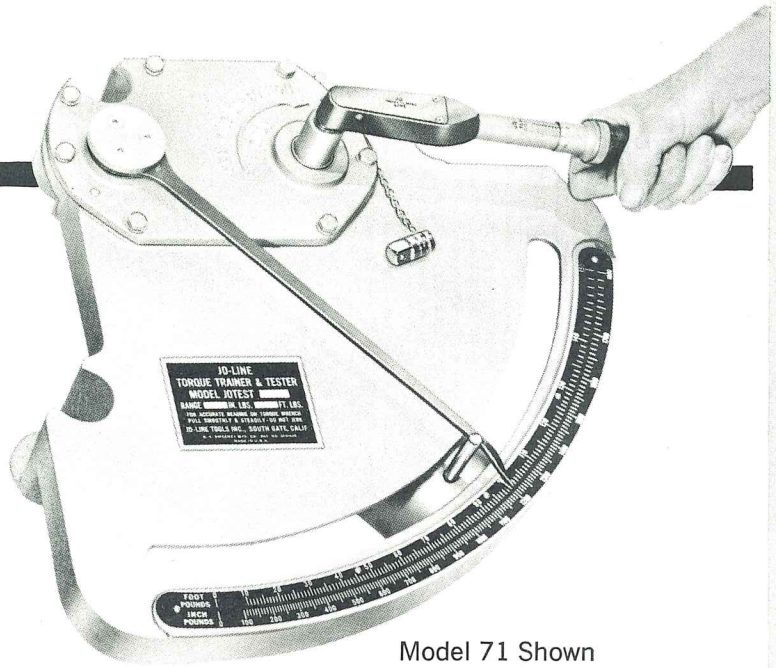
JO LINE

TORQUE TESTERS

(DEAD-WEIGHT PENDULUM TYPE)

FOR FAST, ACCURATE TESTING OF ALL TYPES OF MANUAL TORQUE WRENCHES

AUTOMATICALLY TEACHES PROPER MANNER IN WHICH TO APPLY FORCE TO OBTAIN CONSISTENTLY ACCURATE READINGS



Model 71 Shown

JO-LINE ADVANTAGES

- Single models, at low cost, are within the reach of every user of 5 or more torque tools.
- The complete set of 4 models costs less than other full-range testers, is easier to use and far more versatile.
- Light in weight, permanent and careful mounting is not required.
- Easily moved to job and set up for use.
- Simple, rugged construction, permanently calibrated and virtually indestructible.

OPERATION

1. Attach torque tool to tester at drive socket.
2. Apply torque and note tool reading (if dial or gauge type).
3. Release torque and note tester reading, and
4. Return indicator to zero.

This series of Jo-Line Torque Testers is built on the dead-weight pendulum principle to test the accuracy of all types of torque wrenches. All models are similar in general appearance. Torque applied to the input of the tester transmits movement to the pendulum which in turn moves a stay-set indicator over a combination scale accurately calibrated in both foot-pounds and inch-pounds. The stay-set indicator remains at the highest reading obtained during the test until it is manually re-set to zero. This assures positive readings. The reading on the scale is compared with the reading of the torque wrench. Accuracy or inaccuracy of the torque wrench is immediately apparent.

A mechanic or machinist can test the accuracy of his torque wrench in seconds with a Jo-Line Torque Tester. At the same time he automatically teaches himself the proper manner in which to apply force with a torque wrench to obtain consistently accurate readings. (Misuse of the torque wrench is plainly visible via the tester after a series of consecutive tests of the torque wrench. They'll find that a smooth, steady pull does the right job.) It is now practical to test every torque wrench before and after it is used, to assure an immediately available supply of accurate torque wrenches in the tool crib.

Accuracy of these testers is ±2%. (Testers with certified accuracies of ±1% or ±.5% can be provided at a small additional charge.)

MODEL	RANGE (Combination Scale)	SCALE DIVISIONS	DRIVE	MAX. DIMENSIONS	MOUNTING	WEIGHT
71	600 to 6000 inch-pounds 50 to 500 foot-pounds	25 inch-pounds 5 foot-pounds	¾" sq. female	23¾" x 22½" x 8½"	Wall or Beam	50 Lbs.
72	1200 to 12000 inch-pounds 100 to 1000 foot-pounds	50 inch-pounds 10 foot-pounds	¾" sq. female with 1" female adaptor	27" x 22½" x 8½"	Wall or Beam	70 Lbs.
73	100 to 1800 inch-pounds 10 to 150 foot-pounds	10 inch-pounds 1 foot-pounds	½" sq. female with ⅜" female adaptor	18¾" x 18¼" x 5½"	Wall or Beam	35 Lbs.
75*	10 to 180 inch-pounds 0 to 15 foot-pounds	2 inch-pounds 1 foot-pounds	¼" sq. female with ⅜" female adaptor	11⅝" x 13¼" x 5½" (without case)	Portable (Case is provided)	16 Lbs. (without case)

***NOTE:** Portable Carrying Case provided with Model 75 Torque Tester weighs approximately 10 Lbs. Its maximum dimensions are 13½" x 15" x 6½".

JO-LINE TOOLS, INC.

8442 OTIS STREET
SOUTH GATE, CALIFORNIA
A LOS ANGELES SUBURB.

Phone: LOrain 7-1366
Cable: JONMAC

JO-LINE
JO-LINE
JO-LINE

JO-LINE TOOLS, INC.

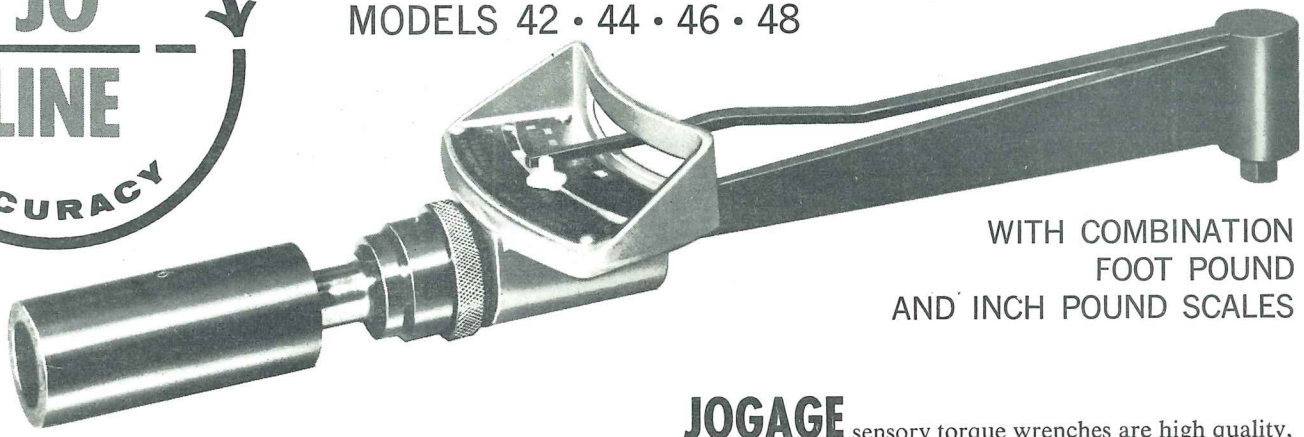
8442 OTIS STREET • SOUTH GATE, CALIFORNIA • 567-1366, Area 213 • Teletype 213-773-5868 • Cable JONMAC

JOGAGE

TORQUE INDICATOR WRENCHES

MODELS 42 • 44 • 46 • 48

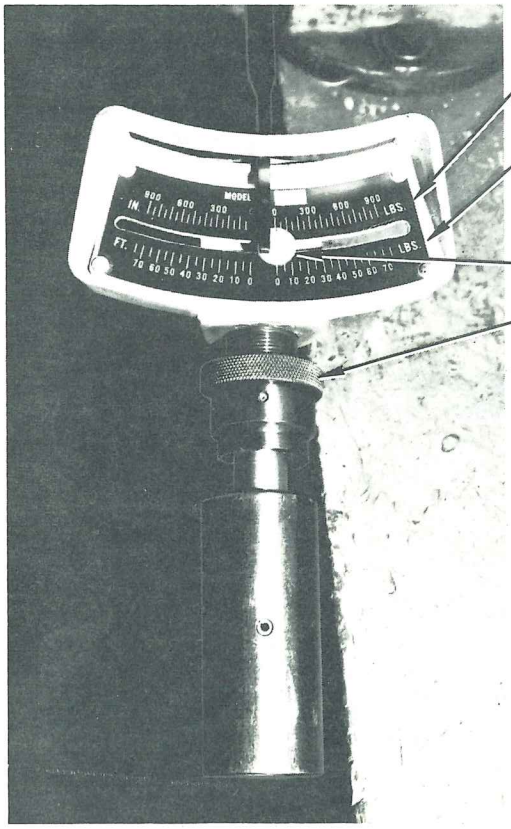
CERTIFIED JO LINE ACCURACY



WITH COMBINATION FOOT POUND AND INCH POUND SCALES

IMPORTANT FEATURES OF JOGAGE TORQUE TOOLS

- ★ Accurate torque assured by Stay-Set indicator
- ★ Adjustable collar quickly, easily and accurately pre-sets desired torque
- ★ Audible *and* impulse "feel" signals are produced when desired pre-set torque has been applied
- ★ Usable as indicator torque wrench only, by turning adjustable collar to non-pre-set position



JOGAGE sensory torque wrenches are high quality, precision instruments — each with two direct reading scales calibrated precisely in both inch pounds and foot pounds. This feature makes it unnecessary for users to buy both kinds. Built on the deflecting beam principle, JOGAGE has a Stay-Set indicator which retains the maximum torque reading reached until it is manually reset to zero. The Stay-Set feature eliminates parallax and provides an automatic zero check.

PRE-SET TORQUE SELECTOR is fully automatic after collar screw is adjusted according to the scale reading. After simple adjustment, which is easily and quickly accomplished to very fine limits, the pre-set torque is subsequently indicated automatically by both a click and an impulse "feel" signal. The adjusting feature requires no "locking," is entirely enclosed, and is unaffected by accidental bumping.

JOGAGE WRENCHES are broad-range to provide more coverage with each size. Only *four* models give torque values from 0 to 5000 inch pounds and 0 to 420 foot pounds.

PIVOTED HANDLES assure maximum accuracy. Model 42 has ball handle for convenient, comfortable operation while the larger sizes are cylindrically shaped.

JOGAGE SPECIFICATIONS

MODEL		42	44	46	48
COMBINATION SCALES	FT.-LBS.	0-25	0-75	0-180	0-420
	IN.-LBS.	0-300	0-900	0-2175	0-5000
INCREMENTS	FT.-LBS.	1	5	5	10
	IN.-LBS.	10	25	25	100
SQUARE DRIVE		⅜"	⅜"	½"	¾"
LEVER ARM LENGTH		11.809"	14.734"	23.621"	32.804"
LBS. PULL AT FULL LOAD		25.8	32.3	94	150
OVER-ALL LENGTH		13½"	17¾"	26⅞"	36⅜"
APPROX. WEIGHT		2 LBS.	3 LBS.	5¾ LBS.	10½ LBS.

SPECIAL TOOLS Quotations for Special Jo-Line Torque Tools available on request, without obligation.

JO-LINE

JO-LINE

JO-LINE

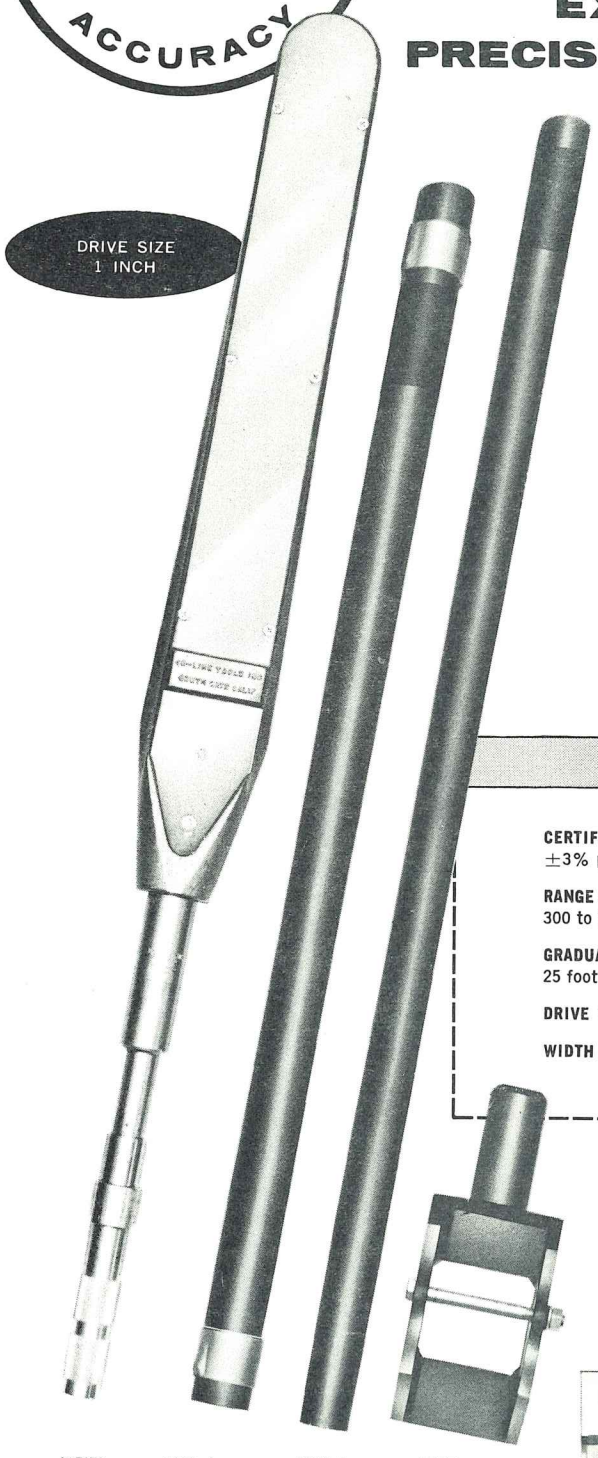
CERTIFIED JO LINE ACCURACY

JOTITE *ADJUSTABLE*

EXTRA-HEAVY-DUTY PRECISION TORQUE LIMITING WRENCH

Model 1202

DRIVE SIZE 1 INCH



JOTITE 1202 — 37 5/16 in. PRIMARY HANDLE — 40 5/16 in. SECONDARY HANDLE — TEE ADAPTER

- ★ Only practical torque wrench for use above 500 foot pounds.
- ★ Nothing for operator to listen for or observe — automatic torque release.
- ★ One or two-man operation — a handle at each end of wrench when needed. Primary handle slips over torque adjustment, secondary handle fits TEE at drive end of wrench.
- ★ Easy to change torque setting with handle adjustment.

SPECIFICATIONS

CERTIFIED ACCURACY:
±3% plus 10 foot pounds

RANGE:
300 to 2000 foot pounds

GRADUATIONS:
25 foot pounds

DRIVE SIZE: 1 inch

WIDTH DRIVE END: 3 inches

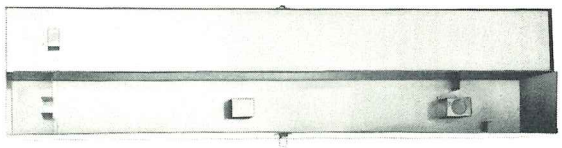
LENGTH OVERALL:
105 inches with both extension handles and TEE adapter in place.

WEIGHT COMPLETE:
52½ pounds, including all standard accessories furnished.

MILITARY:
MIL-H-4034, Types I and III, Size 5; GGG-W-686, Type III, Class 1, Size 8.

STANDARD ACCESSORIES FURNISHED

Two extension handles, Tee adapter with necessary hardware and #1705 metal case.



JO-LINE TOOLS, INC.

8442 OTIS STREET
SOUTH GATE, CALIFORNIA
A LOS ANGELES SUBURB.

Phone: LOrain 7-1366
Cable: JONMAC

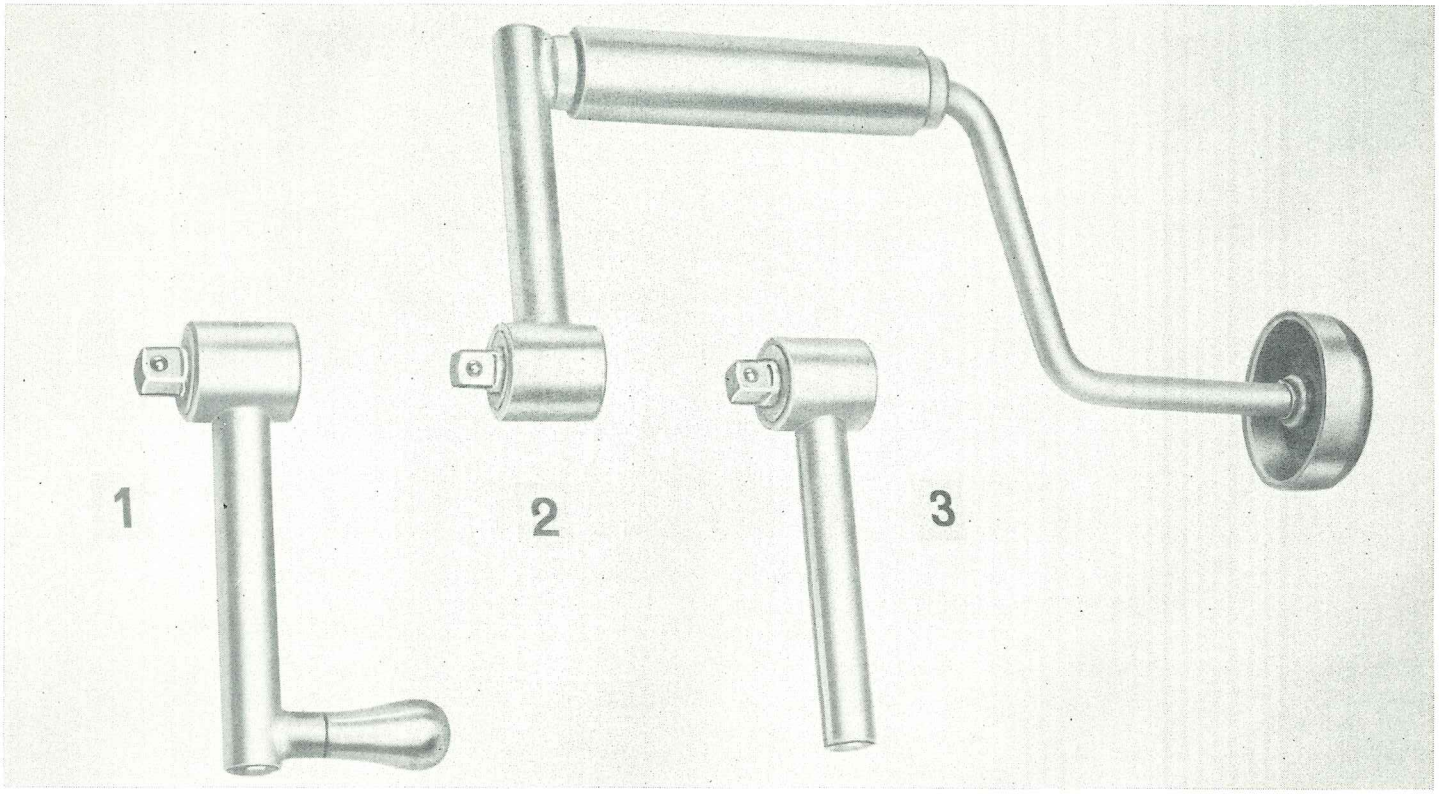
PRINTED IN U. S. A.

CERTIFIED JO LINE ACCURACY

SPEEDER SERIES

MULTIPURPOSE

PRODUCTION TORQUE TOOLS



WIDE RANGE OF APPLICATIONS

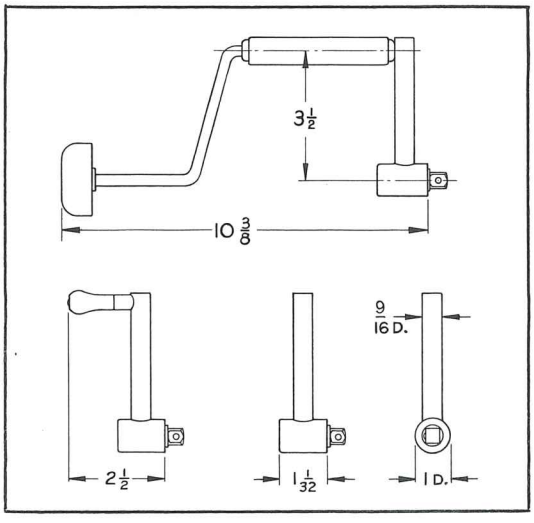
★ No. 1 has freely revolving crank handle. Used to test-inspect torque of automotive window mechanisms; as hand wheels or levers on machine tools to limit feed speed; to assure uniform clamping pressures on part being machined.

★ No. 2 permits hand or body pressure opposite drive tang. Body pressure frees one hand for other functions.

★ No. 3 is the basic "L" handle in Nos. 1 and 2. Each has identical torque mechanism. No. 3 is ideal for small fasteners used in the electronic, aerospace, sheetmetal and other industries.

SPECIFICATIONS AND OPERATION

Sealed torque setting any point between 2 and 50 inch pounds. Drive size: 3/8" square male. Accuracy: ± 1/2 to ± 2 inch pounds. Over-riding clutch mechanism provides complete release. No positive stop. Resets automatically – measures torque in right and left-hand directions. Alloy steel throughout, hard chrome plated finish.



THERE'S A JO-LINE TOOL FOR *every* TORQUE REQUIREMENT!

JO-LINE TOOLS, INC.

8442 OTIS STREET
SOUTH GATE, CALIFORNIA
A LOS ANGELES SUBURB.

Phone: LOrain 7-1366
Cable: JONMAC

M-1-113

PRINTED IN U. S. A.

JOTRU PRE-SET PRECISION TORQUE LIMITING WRENCHES

DRIVE SIZES ¼" TO 1"
RANGES 5 IN. LBS. TO 1000 FT. LBS.

FOR ASSEMBLY OPERATIONS, QUALITY CONTROL, INSPECTION AND MAINTENANCE JOBS

CONTROLS TORQUE IN *BOTH* RIGHT AND LEFT-HAND ROTATION

JOTRU PRE-SET PRODUCTION TORQUE TOOLS

Pre-set for each specific torque-limiting job, Jotru wrenches are *not adjustable by the operator*. By using a Jo-Line JOTEST or other reliable torque tester, Jotru wrenches are quickly and easily checked and, if necessary, re-set. Setting is changed by using a separate, special tool.* Metal plug* protects adjustment.

Construction is all-steel with solid head, usable as a hammer to knock out mismatched pieces of an assembly.

Jotru is the perfect tool where torque values are repetitive and where positive protection against error is necessary.

Special length handles available at nominal charge. Recalibration service available at factory or authorized Jo-Line stations at moderate charge.

MICRO-TORQUE

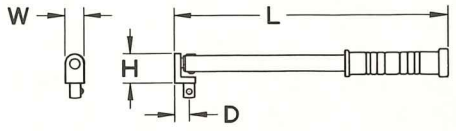
2 INCH OUNCES TO 30 INCH POUNDS

For complete description, illustration, sizes and capacities, see Jospin, Jomite and Jomax catalog sheets.

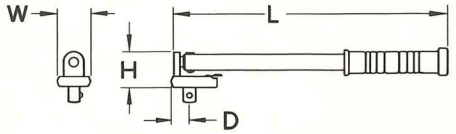
JOTRU ADJUSTMENT Correct torque values are set only by authorized personnel using this special adjusting tool. Non-reusable setting plugs prevent undetected tampering.
*Models 5 and 5A have screwdriver adjustment protected by tamper-proof sealant.

ble as illustrated in a separate Jo-Line bulletin.

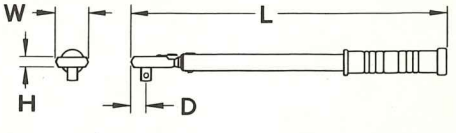
JOTRU MODEL	DRIVE SIZE	RANGE IN. LBS.	RANGE FT. LBS.	L	W	H	D	WEIGHT NET POUNDS	ADJUSTMENT TOOL	ADJUSTMENT PLUG
5-SD4	¼	5-30	½-2½	5¼	⅝	⅞	7/16	.31	*	*
5-SD6	⅜	5-30	½-2½	5¼	⅝	⅞	7/16	.31	*	*
5A-SD4	¼	15-50	1½-4	5¼	⅝	⅞	7/16	.31	*	*
5A-SD6	⅜	15-50	1½-4	5¼	⅝	⅞	7/16	.31	*	*
10-SD6	⅜	25-70	2-6	5¼	⅞	1 3/16	7/16	.69	1826	1827
10A-SD6	⅜	50-250	4-20	6¼	⅞	1 3/16	7/16	.75	1826	1827
50-SD6	⅜	75-500	6-40	10⅜	⅞	1 3/16	7/16	1.13	1826	1827
100-SD8	½	400-1500	33-125	14½	1	1½	¾	2.25	1831A	1832A
100A-SD8	½	400-1500	33-125	18½	1	1½	¾	2.53	1831A	1832A
250-SD8	½	900-3000	75-250	24½	1	1½	¾	3.94	1831A	1832A
500-SD12	¾	2400-6000	200-500	37¼	1½	2	1⅛	7.19	1841	1832
1000-SD16	1	—	300-1000	91½	1½	2⅜	1½	25.00	1841A	—
5-RA4	¼	5-30	½-2½	5¼	1 1/16	1 1/16	½	.44	*	*
5-RA6	⅜	5-30	½-2½	5¼	1 1/16	1 1/16	½	.44	*	*
5A-RA4	¼	15-50	1½-4	5¼	1 1/16	1 1/16	½	.44	*	*
5A-RA6	⅜	15-50	1½-4	5¼	1 1/16	1 1/16	½	.44	*	*
10-RA6	⅜	25-70	2-6	5⅜	1 7/16	1 7/16	¾	1.00	1826	1827
10A-RA6	⅜	50-250	4-20	6⅜	1 7/16	1 7/16	¾	1.06	1826	1827
50-RA6	⅜	75-500	6-40	10⅜	1 7/16	1 7/16	¾	1.38	1826	1827
100-RA8	½	400-1500	33-125	14⅝	1⅞	1 13/16	1	3.19	1831A	1832A
100A-RA8	½	400-1500	33-125	18⅜	1⅞	1 13/16	1	3.56	1831A	1832A
250-RA8	½	900-3000	75-250	24⅝	1⅞	1 13/16	1	4.88	1831A	1832A
5-RAX4	¼	5-30	½-2½	6½	1 1/16	⅜	½	.44	*	*
5-RAX6	⅜	5-30	½-2½	6½	1 1/16	⅜	½	.44	*	*
5A-RAX4	¼	15-50	1½-4	6½	1 1/16	⅜	½	.44	*	*
5A-RAX6	⅜	15-50	1½-4	6½	1 1/16	⅜	½	.44	*	*
10-RAX6	⅜	25-70	2-6	7¼	1 1/16	½	¾	1.00	1826	1827
10A-RAX6	⅜	50-250	4-20	8¼	1 1/16	½	¾	1.06	1826	1827
50-RAX6	⅜	75-500	6-40	12¼	1 1/16	½	¾	1.38	1826	1827
100-RAX8	½	400-1500	33-125	16⅝	1⅞	⅝	1	3.06	1831A	1832A
100A-RAX8	½	400-1500	33-125	20⅝	1⅞	⅝	1	3.50	1831A	1832A
250-RAX8	½	900-3000	75-250	26⅝	1⅞	⅝	1	4.75	1831A	1832A



SD — SQUARE DRIVE — NON-RATCHETING



RA — RATCHETING — SQUARE DRIVE



RAX — EXTENDED RATCHETING — SQUARE DRIVE

32 DIFFERENT MODELS OF PRECISION TORQUE TOOLS

CERTIFIED ACCURACY ± 2% OF MAXIMUM TORQUE CAPACITY

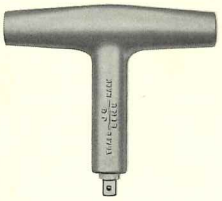
However, on RAX models, accurate torque values require operator's hand to be on grip section at end of handle. Properly used, RAX models are as accurate as SD and RA.

RAX models (note dimensions) are for use where clearance is of prime importance.

CERTIFIED JO LINE ACCURACY

JOTE SCREWDRIVER
SPEED TOOLS

JOTE 5 — Range 2 to 80 inch ounces
JOTE 40 — Range 5 to 50 inch pounds



TWO MODELS — Identical except for capacity, both standard ¼" square drive. Width across TEE, 3⅝" — height 2⅞" — diameter at drive end, ⅝"—net weight .31 pounds. Much better for small, light torquing than screwdriver shape — faster, easier to hold and less fatiguing.

ADAPTERS — Available for Phillips, Frearson, Slotted, Clutch Head and Socket Head Screws in sizes from 00 up.

OPERATION — Controls torque in right-hand direction — ratchets in left-hand direction for maximum operating speed. Also available on special order, *without ratchet,* for torque control in both right and left-hand directions. Release and reset are automatic and continuous, with no impact, no over-torque and no over-travel. Free release occurs over short arc, automatically resets and releases if rotated continually.

ADJUSTMENT — Remove two seals in TEE handle cavities by immersing both handle ends in hot water. Then adjust load screws with ordinary screwdriver and replace seals. JOTE tools are not designed for adjustment on the job — are sealed to prevent tampering by unauthorized personnel.

ACCURACY — JOTE 5, normally certified to ±2 inch ounces — JOTE 40, normally certified to ±2 inch pounds.

COLOR CODING — Provides instant identification of torque setting: Red — JOTE 5. Black — JOTE 40 at low settings. Silver — JOTE 40 at high settings.

Military Description — MIL-H-4034, Type II, Sizes 1 and 2
GGG-W-686, Type IV, Class I, Sizes 1 and 2.

TORQUE INFORMATION AND TABLES

TORQUE FORMULA

LET: T = Torque (inch pounds, inch ounces, foot pounds)
F = Force (pounds, ounces)
L = Length of lever arm (inches, feet)

Note: The lever arm is always measured along a line which passes through the center of rotation perpendicular to the direction of the force.

EQUATION: $T = FL$

TORQUE VALUE CONVERSIONS

A. Inch pounds to foot pounds (refer to Table II)

LET: T = Torque in foot pounds
t = torque in inch pounds

EQUATION: $T = \frac{t}{12}$

B. Foot pounds to inch pounds (refer to Table II)

EQUATION: $t = 12T$

COMPENSATION FORMULAE FOR EXTENSIONS

When adapters are used that rotate about a center not located at the center of the tang of the torque wrench it is necessary to compensate for the additional length. An extension will always increase the capacity of the wrench. For example, a 2 inch extension will increase the limit of a JOTITE 150 to 200 inch pounds.

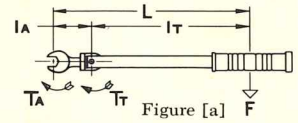


Figure [a]

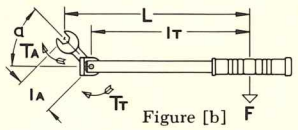


Figure [b]

LET: F = Force (pounds)
l_T = Wrench length (inches) measured from the middle of the handhold to the center of the tang.
l_A = Extension length (inches) measured from center of socket to center of drive square.
L = $l_T + l_A$ (if extension is mounted as in figure [b] measure L as shown or calculate using $L = l_T + l_A \cos a$).
T_T = Torque setting of wrench.
T_A = Torque exerted at extension.

A. To find torque setting (T_T) when desired amount of torque exerted at extension (T_A) is known.

EQUATION: $T_T = \frac{T_A \times l_T}{L}$

B. To find torque exerted at extension for a particular torque setting.

EQUATION: $T_A = \frac{T_T \times L}{l_T}$

DETERMINATION OF AMOUNT OF TORQUE REQUIRED

A torque wrench is used in conjunction with a threaded fastener for the single purpose of controlling the clamping ability of the fastener. The stresses induced in the body of the bolt or screw by tightening provide the force which does the clamping. Since the torque applied to the head of the fastener is directly proportional, or nearly so, to the load applied, it is possible to measure bolt stress by means of a torque wrench.

The first requirement in determining the amount of torque to apply is a knowledge of the desired bolt stress. If this stress is not dictated by the function of the assembly it is common practice to base the limit on the yield strength of the bolt material. Theoretically, screws and bolts may be tightened to the yield point. However, in order to avoid fastener failure during the assembly process it is recommended that the induced stress not be allowed to exceed 80% of the yield strength.

In the original design of a fastener which will be subject to external loading, whether static or dynamic, it will be necessary to establish bolt size and allowable stress in accordance with current engineering practice.

The mathematical relationship between torque applied and the resulting tension force in the bolt has been determined to be as follows:

LET: T = Torque required (inch pounds)
F = Bolt tension desired (pounds)
D = Nominal bolt diameter.

EQUATION: $T = .2\ D\ F$

This relationship is based on the assumption that commercial, steel, semi-finished, regular series nuts with rolled threads, semi-finished steel bolts are used, acting on steel surfaces without lubrication. Tests have shown these conditions will result in a coefficient of friction of .16 at both the thread and head bearing surfaces.

For the usual application this equation can be used to approximate the required torque. Tests can then be conducted to determine a more exact value, if required. In any case, it is important to maintain conditions on the job as consistent as possible to those used at the time of determination.

SPECIAL TOOLS

Quotations for Special Jo-Line Torque Tools available on request, without obligation.

TABLE I — APPROX. TORQUE REQUIREMENTS

This table is intended to give only the approximate amount of torque required to tighten a screw or bolt of specified thread size. Because the conditions affecting each application are subject to many indeterminant variables, the values listed here should not be taken as accurate limits. The compilation of these figures was based on the following assumptions:

(a) Regular series semi-finished nuts.
(b) Rolled thread semi-finished bolts.
(c) Steel nuts, bolts and bearing surfaces. All surfaces unlubricated resulting in a coefficient of friction of .16.
(d) An induced bolt stress of 40,000 pounds per square inch.

Since the ratio between torque applied and induced bolt stress is almost directly proportional, the torque values shown can be varied for different induced bolt stresses by a simple proportion:

EXAMPLE: It is desired to stress a ½-20 NF bolt to 90,000 psi. The table gives a torque value of 675 inch pounds for a stress of 40,000 psi.

THEREFORE: $T = \frac{90{,}000 \times 675}{40{,}000}$

$T = 1519$ inch pounds

Bolt Size	No. Threads per In.	Torque	Recommended Model Torque Wrench: Adjustable	Recommended Model Torque Wrench: Preset	Preset Screwdriver
0	80	16 in. oz.			p
1	64	24 " "			p
1	72	32 " "			p
2	56	36 " "			p
2	64	44 " "			p
3	48	56 " "			p
3	56	64 " "			p
4	40	5 in. lbs.	a	g	pq
4	48	7 " "	ab	g	q
5	40	8 " "	ab	g	q
5	44	9 " "	ab	g	q
6	32	10 " "	ab	g	q
6	40	12 " "	ab	g	q
8	32	22 " "	ab	gh	q
8	36	22 " "	ab	gh	q
10	24	29 " "	ab	ghi	q
10	32	34 " "	ab	hi	q
12	24	62 " "	ab	ij	
12	28	62 " "	ab	ij	
¼	20	70 " "	ab	ij	
¼	28	80 " "	ab	jk	
5/16	18	140 " "	abcdf	jk	
5/16	24	150 " "	abcdf	jk	
⅜	16	250 " "	cdf	jk	
⅜	24	275 " "	cdf	k	
7/16	14	390 " "	cdf	k	
7/16	20	430 " "	cdf	kl	
½	13	630 " "	cdf	l	
½	20	675 " "	cdf	l	
9/16	12	870 " "	def	l	
9/16	18	975 " "	ef	lm	
⅝	11	1200 " "	efrs	lm	
⅝	18	1350 " "	efrs	lm	
¾	10	2200 " "	rs	m	
¾	16	2330 " "	rs	m	
7/8	9	3450 " "	rs	n	
7/8	14	3720 " "	rst	no	
1	8	433 ft. lbs.	t	no	
1	14	475 " "	t	no	
1⅛	7	608 " "	t	o	
1⅛	12	687 " "	t	o	
1¼	7	812 " "	t	o	
1¼	12	942 " "	t	o	
1⅜	6	1133 " "	t		
1⅜	12	1333 " "	t		
1½	6	1500 " "	t		
1½	12	1666 " "	t		

LET: a = JOTITE 150 b = " 180 c = " 750 d = " 900 e = " 1600 f = " 1800 g = JOTRU 5
h = JOTRU 5A i = " 10 j = " 10A k = " 50 l = " 100, 100A m = " 250
n = JOTRU 500 o = " 1000 p = JOTE 5 q = " 40 r = JOMI 4800 s = " 4812 t = " 1202

TABLE II — TORQUE VALUE CONVERSIONS

EXAMPLE: Convert 57 foot pounds to inch pounds:

50 ft. lbs. = 600 in. lbs.
5 ft. lbs. = 60 in. lbs.
2 ft. lbs. = 24 in. lbs.
57 ft. lbs. = 684 in. lbs.

Ft. Lbs. to In. Lbs.		In. Lbs. to Ft. Lbs.	
1	12	1	.08
2	24	2	.17
3	36	3	.25
4	48	4	.33
5	60	5	.42
6	72	6	.50
7	84	7	.58
8	96	8	.67
9	108	9	.75
10	120	10	.83
15	180	15	1.25
20	240	20	1.67
25	300	25	2.08
50	600	50	4.16
100	1200	100	8.33
200	2400	200	16.66
500	6000	500	41.65
1000	12000	1000	83.33
2000	24000	2000	166.60
		5000	416.50